Development of Project Specific Depth-Damage Relationships

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Overview of Presentation

- Introduction
- Define key terms
- Sources and methodology
- Types of depth-damage relationships
- Depth-damage relationships under varying hydrologic conditions
- Development of uncertainty ranges

The Importance of Depth Damage Relationships and CSVRs

- Large and small scale flood reduction studies
- Accurate estimates of damages for structure and contents
- Integral component of methodology for benefits

Definition of Depth-Damage Relationships and CSVRs

- Curves that define the relationship between the depth of flooding and the percent of damage that occurs to structures and their contents and automobiles
- Key terms
  - Depth
  - Percent damage (structures/contents)
  - CSVRs (content-to structure value ratios)

Sources & Methodology of Depth-Damage Relationships and CSVRs

- Flood Insurance Agency (FIA)
  - Based on historical flood claims data
  - Limitations: Insurance coverage vs Damage potential
- Institute of Water Resources (IWR)
  - Based on flood claims data and expert opinion
  - Limitations: Only residential properties covered
- New Orleans District (NOD)
  - Based on interviews with residents and commercial operators that are provided to an expert panel
  - Limitations: Small sample; costly & time consuming

Types of Residential and Non-Residential Depth-Damage Relationships

- Residential
  - Structures
  - Contents
- Non-residential
  - Structures
  - Contents
- Private automobi

Five Types Residential Structure

- One-story on pier
- One-story on sla
- Two-story on pier
- Two-story on slab
- Mobile homes

Non-Residential Structure Types

- Steel frame walls
  - Class A and B
    - High-rise office
    - Hotel
- Masonry bearing walls
  - Class C
    - Restaurant
    - Strip Malls
- Wood or metal frame
  - Class D and S
    - Warehouse
    - Fast Food Restaurants

Structure Content Types

- Residential
  - One-story
  - Two-story
  - Mobile Homes

- Non-Residential
  - Multi-family
  - Professional Businesses
  - Retail and Personal
  - Warehouses and Contractor Operations
  - Public-Semi Public
  - Eating and Recreation
  - Groceries and Gas Stations
  - Repairs and Home Use

Private Automobiles

- Compact Cars
- Mid-size Cars
- Full-size Cars

Depth-Damage Relationships Under Varying Hydrologic Conditions

- Saltwater flooding
  - Tropical Storm
  - Hurricane
- Freshwater/rainfall flooding
  - Riverine
  - Rain Storms
- Duration
  - Short (2 days or less, an average of 1 day)
  - Long (2 days or longer, an average of 1 week)

The Development of Uncertainty Ranges

Estimated minimum, maximum, and most likely percentage damage

Depth-Damage Relationships for 1-Story Pier Structures – Short Duration

(In Percent)

Depth of Flooding	Minimum		Most Likely		Maximum	
	Fresh	Salt	Fresh	Salt	Fresh	Salt
0	10.5	11.6	11.7	12.9	14.6	16.1
1	37.5	41.3	41.7	45.9	52.1	57.3
2	43.0	47.3	47.7	52.5	59.7	65.6
3	47.6	52.4	52.9	58.2	66.2	72.8

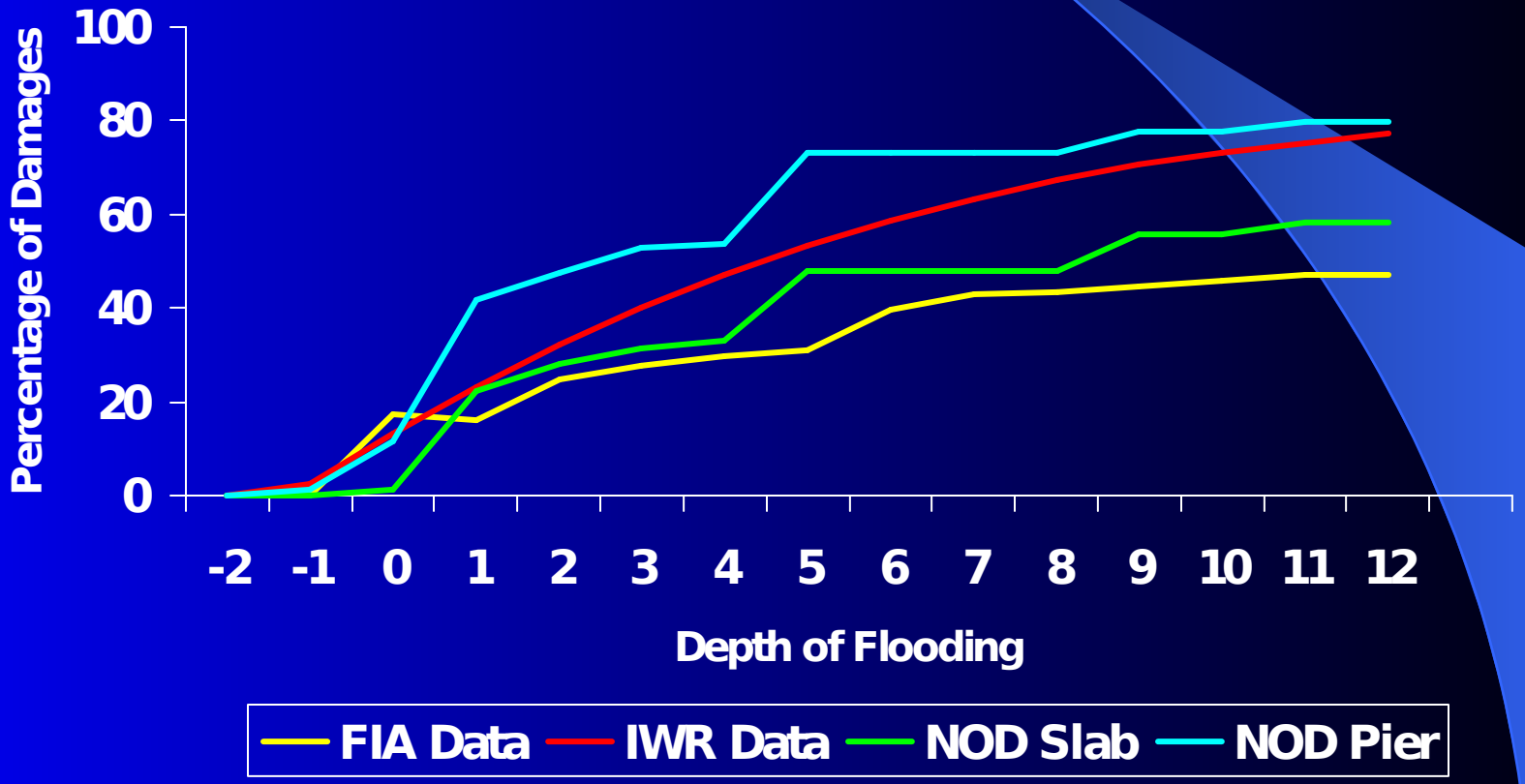
Comparison of Depth-Damage Relationships

1-Story Structures

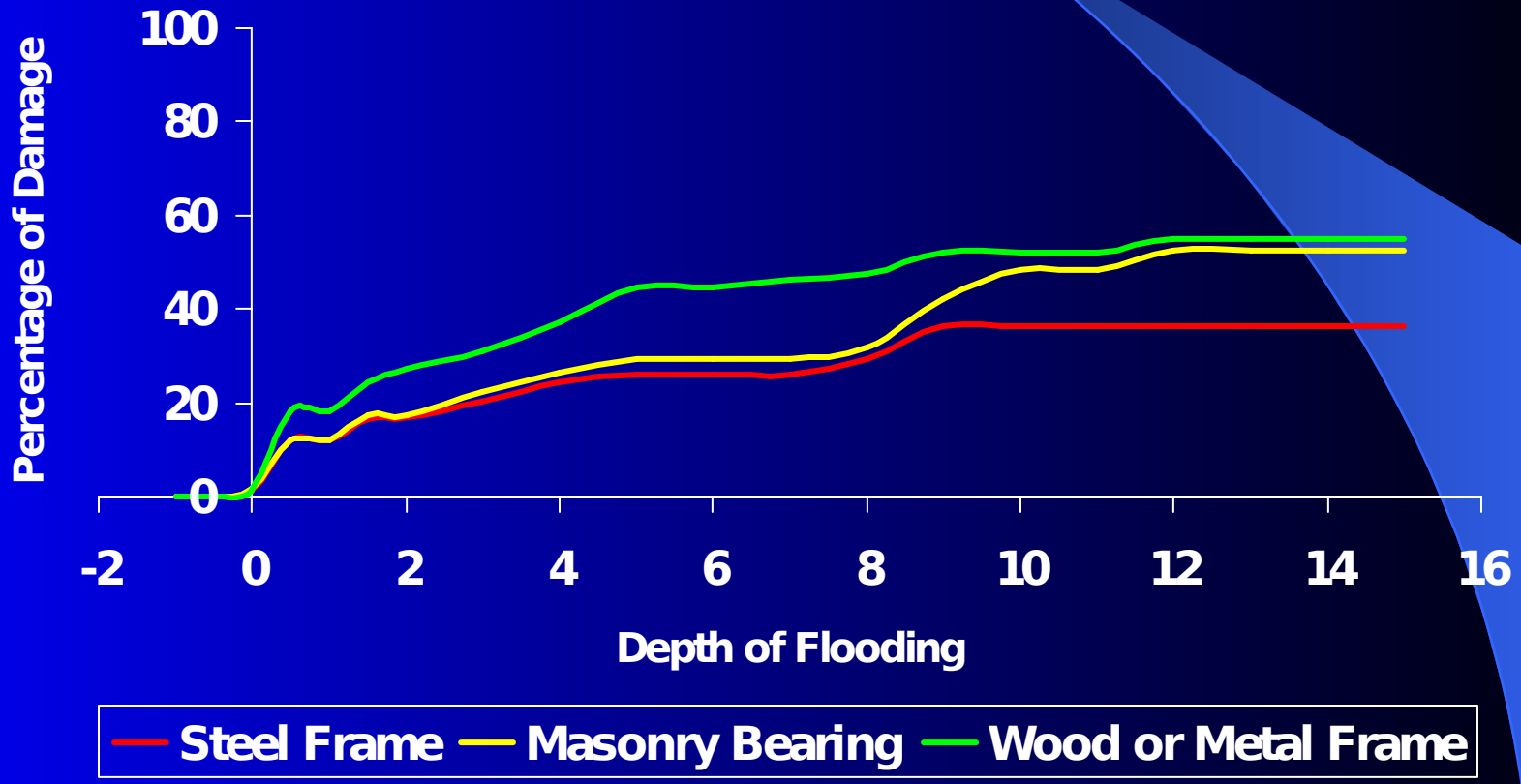
Freshwater – Short Duration

Depth	FIA	IWR	NOD Slab	NOD Pier
1	16.3%	23.3%	22.4%	41.7%
2	24.7%	32.1%	28.0%	47.7%

One-Story Structure Depth-Damage Relationship Comparisons



Non-Residential Depth-Damage Relationship
(Freshwater - Short Duration)



Lessons Learned

- Begin depth-damage task as early as possible in the study process.
- Difficult to get volunteers for surveys and assemble expert panel. Local sponsor participation is required.
- Expert panel is best able to develop depth-damage estimates for residential structures and contents.
- Commercial operators are best able to estimate the value of contents and their depth-damage characteristics.
- Expert panel excels in capturing hydrologic and structural attributes that are unique to the study area.

Questions/Comments?

- Final Reports
  - Jefferson and Orleans
  - Lower Atchafalaya and Morganza to the Gulf
- Website

y.mil/pd/ESAB.ht